

Claims

1. An inorganic resin composition which comprises, in combination, a strongly acidic aqueous solution of metal phosphate (component A), an oxy-boron compound (component B) and a wollastonite compound (component C).

2. A composition according to claim 1 wherein the metal phosphate is selected from the group consisting of aluminium phosphates, zirconium phosphates, magnesium phosphates, zinc phosphates, calcium phosphates, iron phosphates, including derivatives and mixtures thereof.

3. A composition according to claim 1 ~~or 2~~ wherein said oxy-boron compound is selected from the group consisting of boric acid, alkali metal and alkaline-earth metal salts of boric acid, amine and ammonium salts of boric acid, including hydrates and mixtures thereof.

4. A composition according to claim 3 wherein said oxy-boron compound is selected from the group consisting of boric acid, sodium borate, ammonium borate, calcium borate, including hydrates and mixtures thereof.

5. A composition according to claim 3 ~~or 4~~ wherein said oxy-boron compound is as a powder or a liquid.

6. A composition according to claim 1 wherein said wollastonite compound is a natural or synthetic wollastonite, in calcined or non-calcined state, or a combination thereof.

7. A composition according to ~~any one of claims 1 to 6~~ wherein said component A comprises, per 100 parts by weight of said wollastonite compound calculated on a basis of pure calcium silicate:

the equivalent of 14 to 135 parts by weight of phosphorous pentoxide contained in said metal phosphate, and the equivalent of 2 to 65 parts by weight of metal oxide contained in said metal phosphate.

8. A composition according to claim 7 wherein said component A comprises:

the equivalent of 24 to 86 parts by weight of phosphorous pentoxide, and

the equivalent of 5 to 47 parts by weight of metal oxide.

5 9. A composition according to ~~any one of claims~~ 1 to 8 wherein the whole water content of the composition is from 8 to 150 parts by weight per 100 parts by weight of said wollastonite compound calculated on a basis of pure calcium silicate.

10 10. A composition according to claim 9 wherein the whole water content of the composition is from 11 to 95 parts by weight.

15 11. A composition according to ~~any one of~~ claims 1 to 10 wherein said oxy-boron compound is present, calculated on an anhydrous basis, in an amount of 0.2 to 50 parts by weight per 100 parts by weight of said wollastonite compound calculated on a basis of pure calcium silicate.

20 12. A composition according to claim 11 wherein said oxy-boron compound, calculated on an anhydrous basis, is present in an amount of 2 to 20 parts by weight.

25 13. A composition according to ~~any one of claims~~ 6 to 12 wherein the particle size and the aspect ratio of the wollastonite are not larger than 150 μ m and 10 respectively.

30 14. A composition according to ~~any one of the~~ claims 1 to 13 which comprises at least additives such as fibres, a filler, a foaming agent, a surfactant, and a pigment, used either alone or in combination thereof.

35 15. A composition according to claim 14 wherein said surfactant is zinc stearate.

16. A composition according to claim 14 ~~or 15~~ wherein said foaming agent is a carbonate selected from the group consisting of calcium carbonate, magnesium carbonate, sodium carbonate, potassium carbonate, used either as powder or aqueous solution, or a combination thereof.

17. A composition according to ~~any one of claims~~
14 ~~to 16~~ wherein said filler is silica or a derivative
thereof.

18. A composition according to ~~any one of claims~~
5 14 ~~to 17~~ wherein said fibre is selected from the group
consisting of metal fibre, organic fibre, and inorganic
fibre including glass fibre.

19. A process for preparing said strongly acidic aqueous
solution of metal phosphate of said composition according to
10 ~~any one of claims 1 to 18~~ which comprises mixing metal
and/or metal oxide and/or metal phosphate including hydrates
and derivatives thereof in phosphoric acid aqueous solution
at a temperature and for a time sufficient to form at least
a semi-transparent solution.

20. A process for preparing a product of the
inorganic resin composition according to ~~any one of claims 1~~
15 ~~to 19~~, which comprises:

mixing said strongly acidic aqueous solution of metal phosphate with
said oxy-boron compound at a temperature and for a time
20 sufficient to form an aqueous solution, and

contacting said wollastonite compound and optionally one
or more of said additives with the above solution to form a
slurry, and

bringing said slurry on a surface capable of at least
25 partially supporting said slurry wherein said slurry reacts
to set as a shaped product of the inorganic resin
composition.

21. A process for preparing a prepreg product of
said inorganic resin composition according to ~~any one of~~
30 ~~claims 1 to 19~~, which comprises:

mixing said component A, said component B, said
component C and optionally one or more of said additives to
form a slurry, and

impregnating fibres with said slurry, and

keeping the impregnated fibres, which is called prepreg, at a temperature sufficiently low to prevent any setting reaction, and

bringing said prepreg on a surface capable of supporting said prepreg wherein the slurry reacts to set as a shaped product of said prepreg.

22. A process according to claim 20 or ~~21~~ wherein said slurry is kept at a temperature sufficiently low to retard any setting reaction before being brought on said supporting surface.

23. A process according to ~~any one of claims 20 to 22~~ wherein said supporting surface comprises fibres including inorganic, organic and/or metallic fibres.

24. A process according to ~~any one of claims 20 to 23~~ wherein said slurry impregnates said fibres of said supporting surface to form a fibre reinforced product.

25. A process according to ~~any one of claims 20 to 22~~ wherein said supporting surface is made of metal, organic, or inorganic material.

26. Use of an inorganic resin composition according to any one of claims 1 to 19 and/or a shaped product of the inorganic resin composition prepared by the process according to any one of claims 20 to 25, as a binder, coating, surfacing agent, adhesive, cementing agent.

27. Use according to claim 26 wherein the shaped product has a foamed structure.

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AMENDED SHEET